



# PHYSICS

## BOOKS - DISHA PHYSICS (HINGLISH)

### PHYSICAL WORLD, UNITS & MEASUREMENT

#### Physics

1. The density of material in CGS system of mass is  $4gcm^3$  in a system of unit in which

unit of length is  $10\text{cm}$  and unit of mass is  $100\text{g}$  the value of density of material will be

- A. 0.4 unit
- B. 40 unit
- C. 400 unit
- D. 0.04 unit

**Answer:**



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2. The period  $T$  of a soap bubble under  $SHM$  is given by  $T = P^a D^b S^c$ , where  $P$  is pressure,  $D$ , is density and  $S$  is surface tension. Then the values of  $a$ ,  $b$  and  $c$  are

A.  $-\frac{3}{2}, \frac{1}{2}, 1$

B.  $-1, -2, 3$

C.  $\frac{1}{2}, -\frac{3}{2}, -\frac{1}{2}$

D.  $1, 2, \frac{1}{3}$

**Answer:**



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3. The respective number of significant figures for the numbers 23.023, 0.0003 and  $2.1 \times 10^{-3}$  are

A. 5,1,2

B. 5,1,5

C. 5,5,2

D. 4,4,2

**Answer:**





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4. Young's modulus of a material has the same unit as

- A. pressure
- B. strain
- C. compressibility
- D. force

**Answer:**



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5. Of the following quantities , which one has the dimensions different from the remaining three?

A. Energy per unit volume

B. Force per unit area

C. Product of voltage and charge per unit  
volume

D. Angular momentum

**Answer:**



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6. The pressure on a square plate is measured by measuring the force on the plate and the length of the sides of the plate by using the formula  $p = \frac{F}{l^2}$ . If the maximum errors in the measurement of force and length are 4% and 2% respectively. Then the maximum error in the measurement of pressure is

A. 0.01

B. 0.02

C. 0.08

D. 0.1

**Answer:**



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7. Siemen is the *S. I* unit of

A. resistivity



B. resistance

C. conductivity

D. conductance

**Answer:**



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**8.** An object is moving through the liquid. The viscous damping force acting on it is proportional to the velocity. Then dimensions of constant of proportionality are

A.  $[ML^{-1}T^{-1}]$

B.  $[MLT^{-1}]$

C.  $[M^0LT^{-1}]$

D.  $[ML^0T^{-1}]$

**Answer:**



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9. The least count of a stop watch is  $(1/5)s$ .

The time 20 oscillations of a pendulum is

measured to be  $25s$ . The maximum percentage error in this measurement is

A. 8 %

B. 1.8 %

C. 0.8 %

D. 0.2 %

**Answer:**



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10. Weber is the unit of

- A. magnetic susceptibility
- B. intensity of magnetisation
- C. magnetic flux
- D. magnetic permeability

**Answer:**



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11. The physical quantity which has the dimensional formula  $[M^1T^{-3}]$  is

A. surface tension

B. solar constant

C. density

D. compressibility

**Answer:**



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12. The dimensions of Wien's constant are

A.  $[ML^0TK]$

B.  $[M^0LT^0K]$

C.  $[M^0L^0TK]$

D.  $[MLTK]$

**Answer:**



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13. If the capacitance of a nanocapacitor is measured in terms of a unit  $u$  made by combining the electric charge  $e$ , Bohr radius  $a_0$ , Planck's constant 'h' and speed of light 'c' then

A.  $u = \frac{e^2 h}{a_0}$

B.  $u = \frac{hc}{e^2 a_0}$

C.  $u = \frac{e^2 c}{h a_0}$

D.  $u = \frac{e^2 a_0}{hc}$

**Answer:**



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14. The dimensions of  $\frac{1}{\epsilon_0} \frac{e^2}{hc}$  are

A.  $M^{-1}L^{-3}T^4A^2$

B.  $ML^3T^{-4}A^{-2}$

C.  $M^0L^0T^0A^0$

D.  $M^{-1}L^{-3}T^2A$

**Answer:**



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**15.** The density of a cube is measured by measuring its mass and length of its sides. If the maximum error in the measurement of mass and length are 4% and 3% respectively, the maximum error in the measurement of density will be

A. 0.07

B. 0.09

C. 0.12

D. 0.13

**Answer:**



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**16.** Which is different from others by units ?

- A. Phase difference
- B. Mechanical equivalent
- C. Loudness of sound
- D. Poisson's ratio

**Answer:**



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17. a quantity  $X$  is given by  $\epsilon_0 L \frac{\Delta V}{\Delta t}$  where  $\epsilon_0$  is the permittivity of the free space,  $L$  is a length,  $\Delta V$  is a potential difference and  $\Delta t$  is a time interval. The dimensional formula for  $X$  is the same as that of

A. resistance

B. charge

C. voltage

D. current

**Answer:**



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**18.** If error in measurement of radius of a sphere is 1%, what will be the error in measurement of volume?

A. 0.02

B. 0.03

C. 0.04

D. 0.075

**Answer:**



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**19.** If velocity (V) , force (F), and energy (E) are taken as fundamental units , then find the dimensional formula for mass.

A.  $V^{-2} F^0 E$

B.  $V^0FE^2$

C.  $VF^{-2}E^0$

D.  $V^{-2}F^0E$

**Answer:**



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**20.** multiply 107.88 by 0.610 and express the result with correct number of significant figures.

A. 65.8068

B. 65.807

C. 65.81

D. 65.8

**Answer:**



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**21.** Which of the following is a dimensional constant?

A. Refractive index

B. Poissons ratio

C. Strain

D. Gravitational constant

**Answer:**



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**22.** If  $E$ ,  $M$ ,  $J$ , and  $G$ , respectively, denote energy, mass, angular momentum, and



gravitational constant , then  $EJ^2 / M^5 G^2$  has  
the dimensions of

- A. angle
- B. length
- C. mass
- D. time

**Answer:**



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23. The refractive index of water measured by the relation  $m = \frac{\text{realdepth}}{\text{apparentdepth}}$  is found to have values of 1.34, 1.38, 1.32 and 1.36, the mean value of refractive index with percentage error is

A.  $1.35 \pm 1.48 \%$

B.  $1.35 \pm 0 \%$

C.  $1.36 \pm 6 \%$

D.  $1.36 \pm 0 \%$

**Answer:**



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24. If  $e$  is the charge,  $V$  the potential difference,  $T$  the temperature, then the units of  $\frac{eV}{T}$  are the same as that of

- A. Planck's constant
- B. Stefan's constant
- C. Boltzmann's constant
- D. gravitational constant

**Answer:**



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25. The dimensions of mobility are

A.  $M^{-2}T^2A$

B.  $M^{-1}T^2A$

C.  $M^{-2}T^3A$

D.  $M^{-1}T^3A$

**Answer:**



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26. Two quantities  $A$  and  $B$  have different dimensions. Which mathematical operation given below is physically meaningful?

A.  $A / B$

B.  $A + B$

C.  $A - B$

D.  $A = B$

**Answer:**



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27. The velocity of water wave  $v$  may depend on their wavelength  $\lambda$ , the density of water  $\rho$  and the acceleration due to gravity  $g$ . The method of dimensions gives the relation between these quantities as

A.  $v$

B.  $v^2 \propto g\lambda$

C.  $v^2 \propto g\lambda^2$

D.  $v^2 \propto g^{-1}\lambda^2$

**Answer:**



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**28.** The physical quantities not having same dimensions are

A. torque and work

B. momentum and Planck's constant

C. stress and Young's modulus

D. speed and  $(m_0 e_0)^{-1/2}$

**Answer:**



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**29.** A physical energy of the dimension of length that can be formula cut of  $c$ ,  $G$  and  $\frac{e^2}{4\pi\epsilon_0}$  is [ $c$  is velocity of light  $G$  is universal constant of gravitation  $e$  is charge

A.  $c^2 \left[ G \frac{e^2}{4\pi\epsilon_0} \right]^{1/2}$

B.  $\frac{1}{c^2} \left[ \frac{e^2}{G4\pi\epsilon_0} \right]^{1/2}$

C.  $\frac{1}{c} G \frac{e^2}{4\pi\epsilon_0}$



$$D. \frac{1}{c^2} \left[ G \frac{e^2}{4\pi\epsilon_0} \right]^{1/2}$$

**Answer:**



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**30.** The unit of impulse is the same as that of

A. energy

B. power

C. momentum

D. velocity

**Answer:**



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31. If  $Q$  denote the charge on the plate of a capacitor of capacitance  $C$  then the dimensional formula for  $\frac{Q^2}{C}$  is

A.  $[L^2 M^2 T]$

B.  $[LMT^2]$

C.  $[L^2 MT^{-2}]$

D.  $[L^2 M^2 T^2]$

**Answer:**



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**32.** The mass of the liquid flowing per second per unit area of cross-section of the tube is proportional to (pressure difference across the ends)<sup>(n)</sup> and (average velocity of the liquid)<sup>(m)</sup>. Which of the following relations between m and n is correct?

A.  $m = n$

B.  $m = -n$

C.  $m^2 = n$

D.  $m = -n^2$

**Answer:**



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**33.** The richardson equaction is given by

$I = AT^2 e^{-B/kT}$ . The dimensional formula for

$AB^2$  is

A.  $IT^2$

B.  $kT$

C.  $Ik^2$

D.  $Ik^2 / T$

**Answer:**



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**34.** Turpentine oil is flowing through a tube of length  $L$  and radius  $r$ . The pressure difference between the two ends of the tube is  $p$ , the

viscosity of the coil is given by

$$\eta = \frac{p(r^2 - x^2)}{4vL}, \text{ where } v \text{ is the velocity of oil}$$

at a distance  $x$  from the axis of the tube. From

this relation, the dimensions of viscosity  $\eta$  are

A.  $[ML^{-1}T^{-1}]$

B.  $[MLT^{-1}]$

C.  $[ML^2T^{-2}]$

D.  $[M^0L^0T^0]$

**Answer:**



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35. Given that  $y = A \sin \left[ \left( \frac{2\pi}{\lambda} (ct - x) \right) \right]$

where  $y$  and  $x$  are measured in metres, Which of the following statements is true ?

A. The unit of  $l$  is same as that of  $x$  and  $A$

B. The unit of  $l$  is same as that of  $x$  but not of  $A$

C. The unit of  $c$  is same as that of  $\frac{2\pi}{\lambda}$

D. The unit of  $(ct - x)$  is same as that of  $\frac{2\pi}{\lambda}$

**Answer:**



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36. If  $L = 2.331\text{cm}$ ,  $B = 2.1\text{cm}$ , then  $L+B=$

A. 4.431 cm

B. 4.43 cm

C. 4.4 cm

D. 4 cm

**Answer:**



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37. In the relation  $x = \cos(\omega t + kx)$ , the dimension(s) of  $\omega$  is/are

A.  $[M^0 LT]$

B.  $[M^0 L^{-1} T^0]$

C.  $[M^0 L^0 T^{-1}]$

D.  $[M^0 LT^{-1}]$

**Answer:**



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**38.** In a vernier callipers, ten smallest divisions of the vernier scale are equal to nine smallest division on the main scale. If the smallest division on the main scale is half millimeter, then the vernier constant is

A. 0.5 mm

B. 0.1 mm

C. 0.05 mm

D. 0.005 mm

**Answer:**



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39. Which two of the following five physical parameters have the same dimensions?

Energy density

Refractive index

Dielectric constant

Young's modulus

Magnetic field

A. (B) and (D)

B. (C) and  $\epsilon$

C. (A) and (D)

D. (A) and ( e)

**Answer:**



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**40.** In the eqn.

$$\left( p + \frac{a}{V^2} \right) (V - b) = \text{constant}$$

unit of a is

A. dyne  $cm^5$

B. dyne  $cm^4$

C. dyne/ $cm^3$

D. dyne / $cm^2$

**Answer:**



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**41.** The dimensions of Reynold's constant are

A.  $[M^0 L^0 T^0]$

B.  $[ML^{-1}T^{-1}]$

C.  $[ML^{-1}T^{-2}]$

D.  $[ML^{-2}T^{-2}]$

**Answer:**



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**42.** Which of the following does not have the dimensions of velocity ? ( Given  $\epsilon_0$  is the permittivity of free space ,  $\mu_0$  is the permeability of free space ,  $\nu$  is frequency,  $\lambda$  is wavelength ,  $P$  is the pressure , and  $\rho$  is

density ,  $k$  is wave number ,  $\omega$  is the the angular frequency)

A.  $1 / \sqrt{\mu_0 \epsilon_0}$

B.  $n - 1$

C.  $\sqrt{P / \rho}$

D.  $\omega k$

**Answer:**



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43. Unit of magnetic moment is

A. *ampere–metre<sup>2</sup>*

B. *ampere – metre*

C. *weber – metre<sup>2</sup>*

D. *weber / metre*

**Answer:**



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**44.** An experiment is performed to obtain the value of acceleration due to gravity  $g$  by using a simple pendulum of length  $L$ . In this experiment time for 100 oscillations is measured by using a watch of 1 second least count and the value is 90.0 seconds. The length  $L$  is measured by using a meter scale of least count 1 mm and the value is 20.0 cm. The error in the determination of  $g$  would be:

A. 0.017

B. 0.027

C. 0.044

D. 0.0227

**Answer:**



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**45.** The dimensional formula for magnetic flux is

A.  $[ML^2T^{-2}A^{-1}]$

B.  $[ML^3T^{-2}A^{-2}]$

C.  $[M^0 L^{-2} T^2 A^{-2}]$

D.  $[ML^2 T^{-1} A^2]$

**Answer:**



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